Fig.1A

RING CONNECTION NETWORK

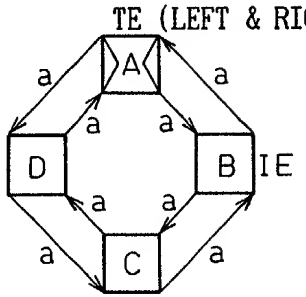


Fig.1B

LINEAR CONNECTION NETWORK

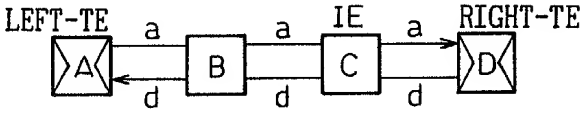


Fig.1C

STRUCTURE OF LOGICAL COMMUNICATION PATH IN RING CONNECTION NETWORK

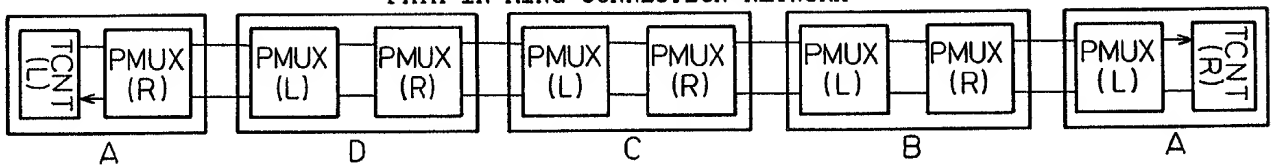


Fig.1D

STRUCTURE OF LOGICAL COMMUNICATION PATH IN LINEAR CONNECTION NETWORK

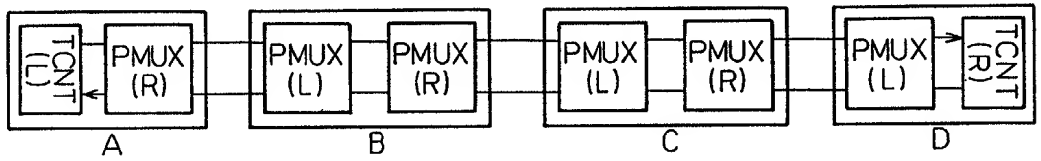


Fig.2A

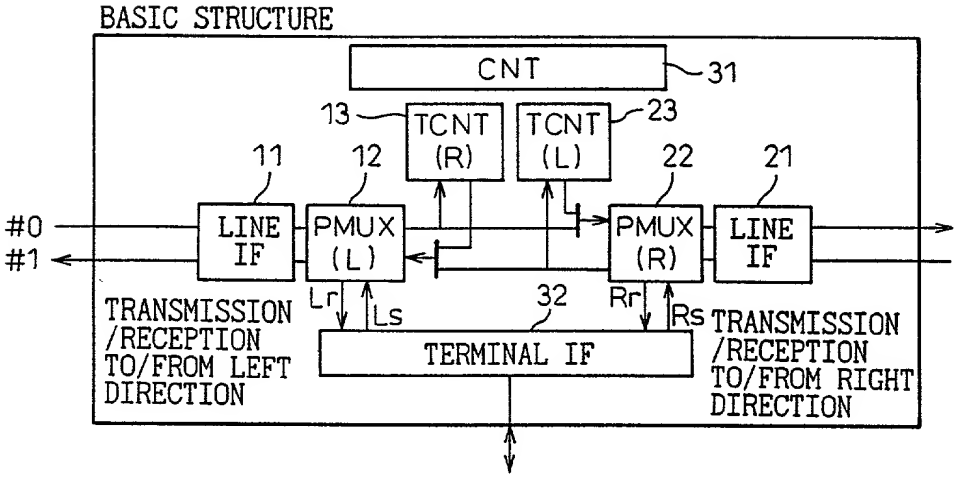

BASIC STRUCTURE
CNT
31
13
TCNT (R)
TCNT (L)
23
11
12
22
21
#0
#1
LINE IF
PMUX (L)
PMUX (R)
LINE IF
Lr
Ls
32
Rr
Rs
TRANSMISSION /RECEPTION TO/FROM LEFT DIRECTION
TERMINAL IF
TRANSMISSION /RECEPTION TO/FROM RIGHT DIRECTION

Fig.2B

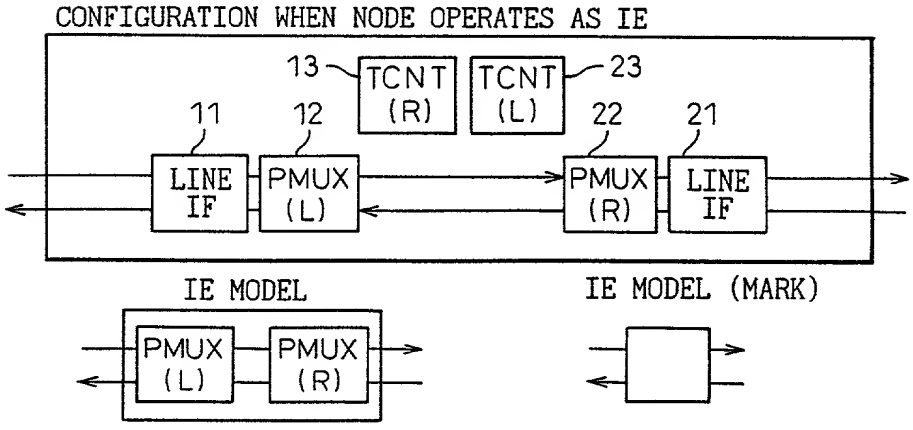

CONFIGURATION WHEN NODE OPERATES AS IE
13
TCNT (R)
TCNT (L)
23
11
12
22
21
LINE IF
PMUX (L)
PMUX (R)
LINE IF
IE MODEL
PMUX (L)
PMUX (R)
IE MODEL (MARK)

Fig.2C

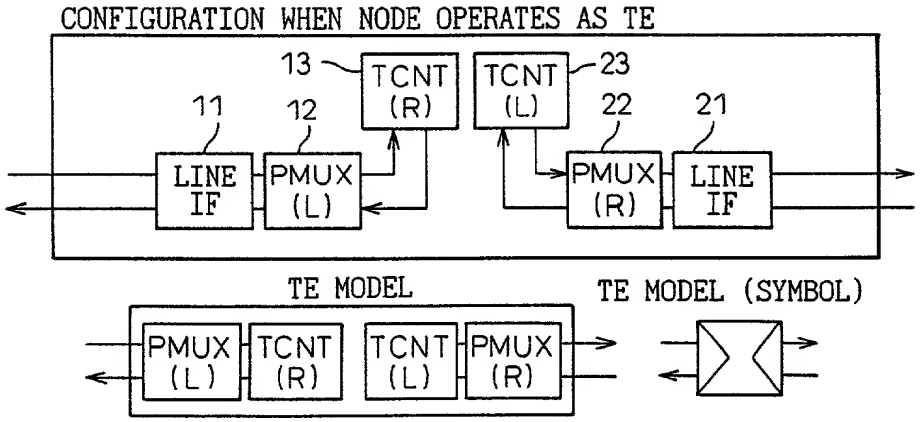

CONFIGURATION WHEN NODE OPERATES AS TE
13
TCNT (R)
TCNT (L)
23
11
12
22
21
LINE IF
PMUX (L)
PMUX (R)
LINE IF
TE MODEL
TE MODEL (SYMBOL)
PMUX (L)
TCNT (R)
TCNT (L)
PMUX (R)

Fig.3A

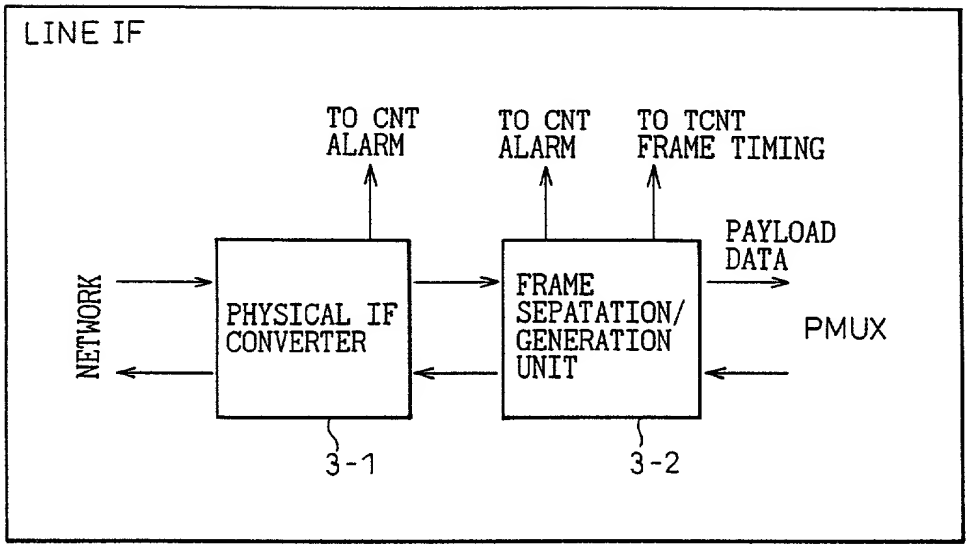

LINE IF
TO CNT ALARM
TO CNT ALARM
TO TCNT FRAME TIMING
PAYLOAD DATA
NETWORK
PHYSICAL IF CONVERTER
FRAME SEPATATION/ GENERATION UNIT
PMUX
3-1
3-2

Fig.3B

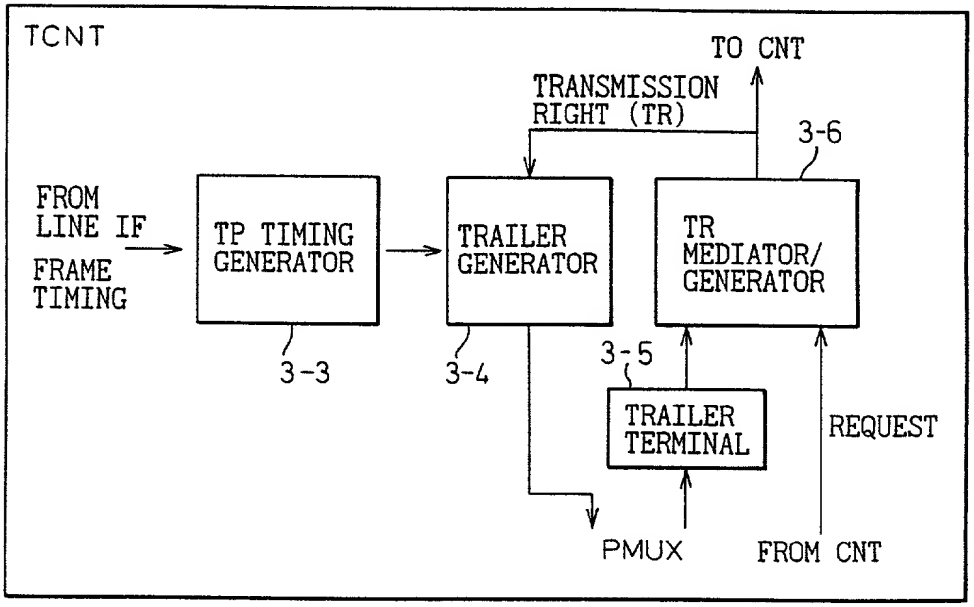

TCNT
TO CNT
TRANSMISSION RIGHT (TR)
3-6
FROM LINE IF
FRAME TIMING
TP TIMING GENERATOR
TRAILER GENERATOR
TR MEDIATOR/ GENERATOR
3-3
3-4
3-5
TRAILER TERMINAL
REQUEST
PMUX
FROM CNT

Fig.4

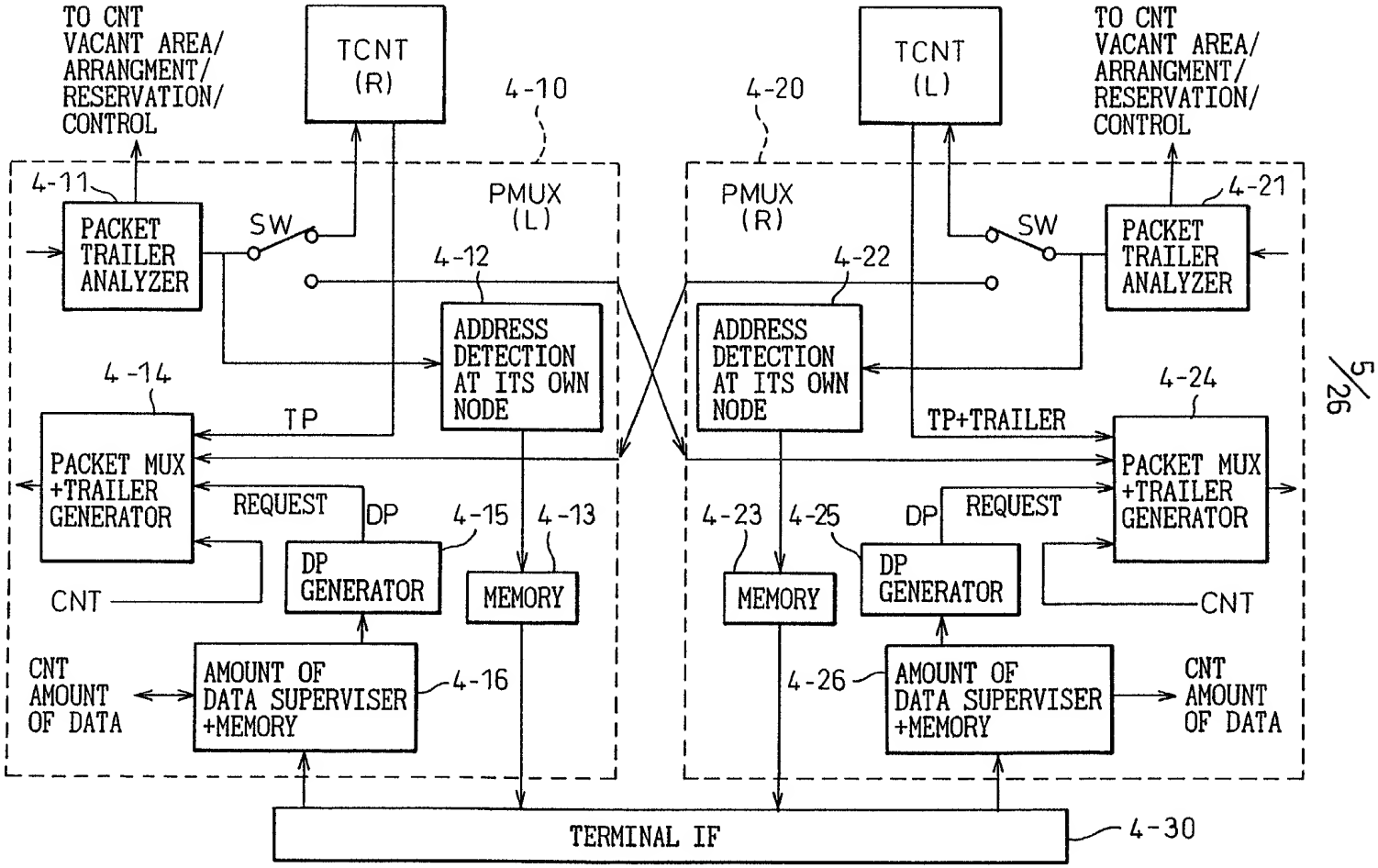

TO CNT VACANT AREA/ ARRANGMENT/ RESERVATION/ CONTROL
TCNT (R)
4-10
PMUX (L)
4-11
PACKET TRAILER ANALYZER
SW
4-12
ADDRESS DETECTION AT ITS OWN NODE
4-14
TP
PACKET MUX +TRAILER GENERATOR
REQUEST
DP
4-15
4-13
DP GENERATOR
MEMORY
CNT
CNT AMOUNT OF DATA
AMOUNT OF DATA SUPERVISER +MEMORY
4-16
TCNT (L)
4-20
PMUX (R)
4-22
ADDRESS DETECTION AT ITS OWN NODE
TP+TRAILER
4-24
PACKET MUX +TRAILER GENERATOR
4-23
4-25
DP
REQUEST
DP GENERATOR
MEMORY
CNT
4-26
AMOUNT OF DATA SUPERVISER +MEMORY
CNT AMOUNT OF DATA
TO CNT VACANT AREA/ ARRANGMENT/ RESERVATION/ CONTROL
4-21
PACKET TRAILER ANALYZER
SW
TERMINAL IF
4-30

Fig.5

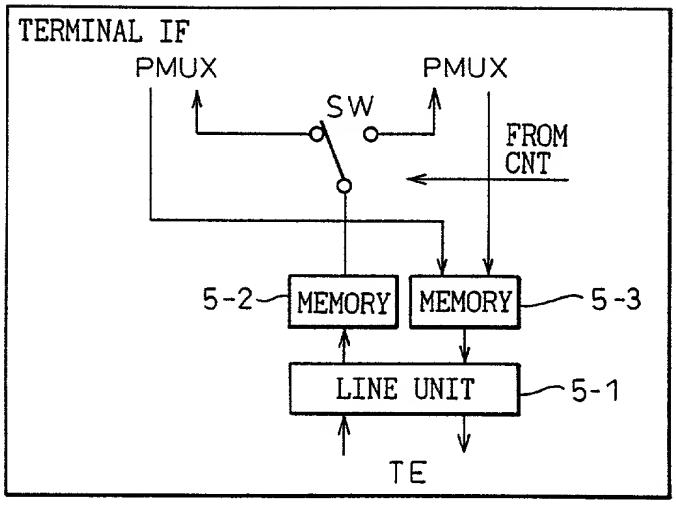

TERMINAL IF
PMUX
PMUX
SW
FROM
CNT
5-2
MEMORY
MEMORY
5-3
LINE UNIT
5-1
TE

Fig.6A

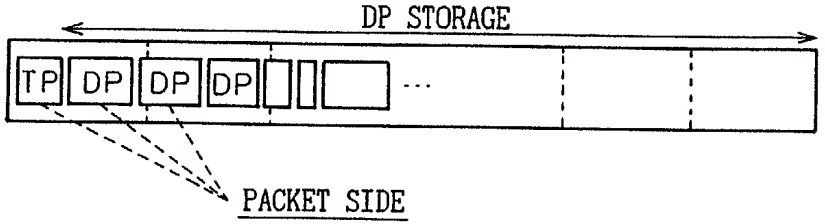
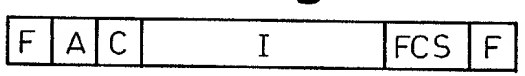


Fig.6B



TP: TOKEN PACKET
DP: DATA PACKET
CP: CONTROL PACKET

Fig.6C

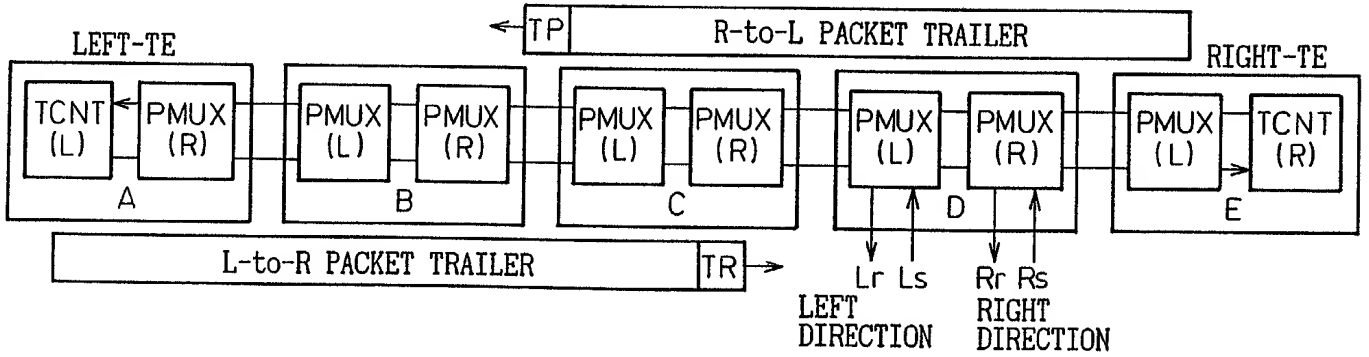


Fig.7

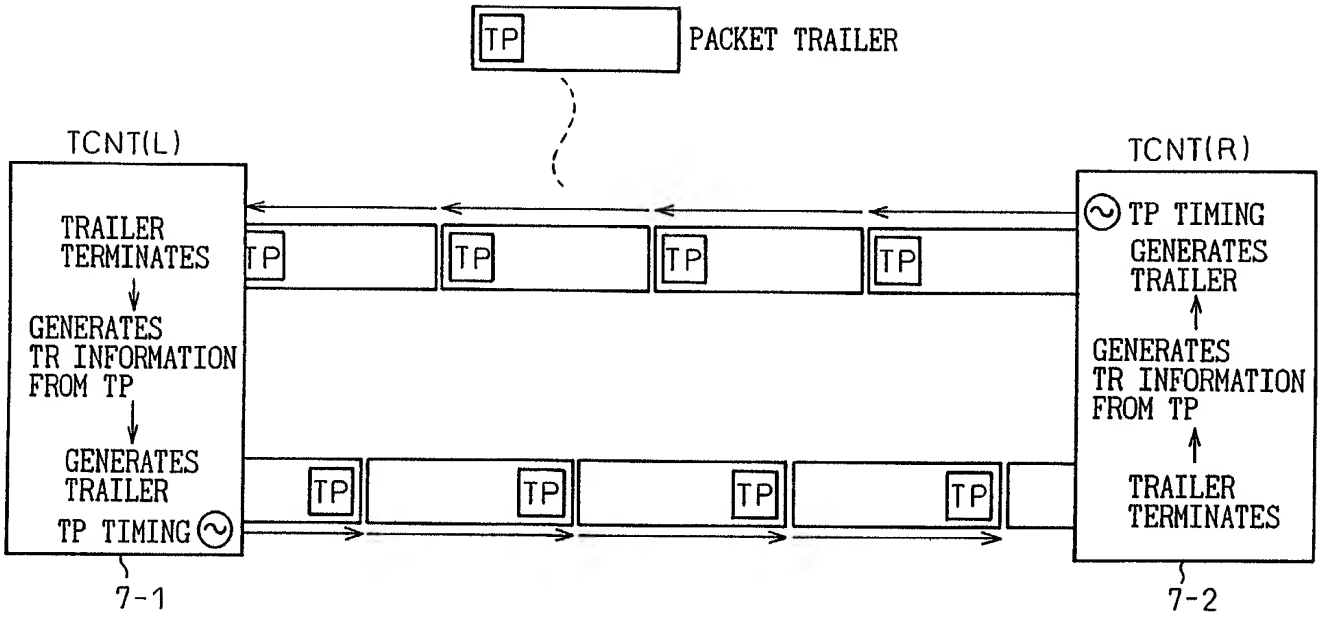

TP
PACKET TRAILER
TCNT(L)
TRAILER TERMINATES
GENERATES TR INFORMATION FROM TP
GENERATES TRAILER
TP TIMING
TP
TP
TP
TP
TP
TP
TP
TP
TCNT(R)
TP TIMING
GENERATES TRAILER
GENERATES TR INFORMATION FROM TP
TRAILER TERMINATES
7-1
7-2

Fig.8A

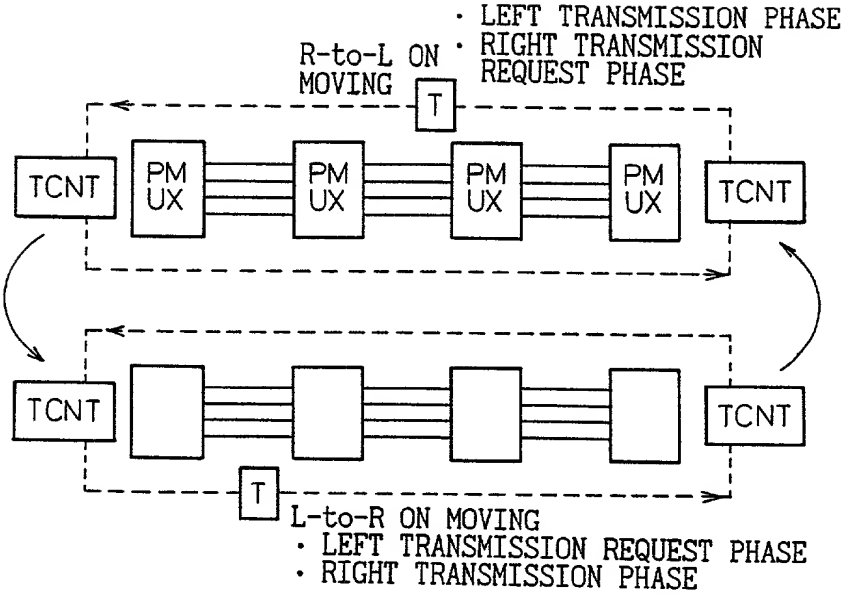


Fig.8B

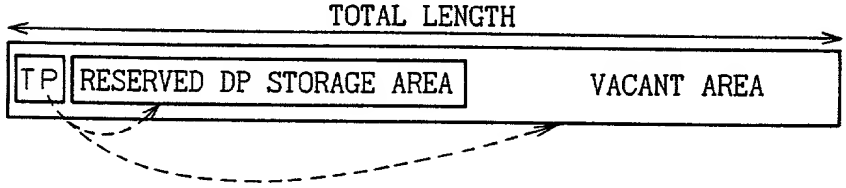


Fig.8C

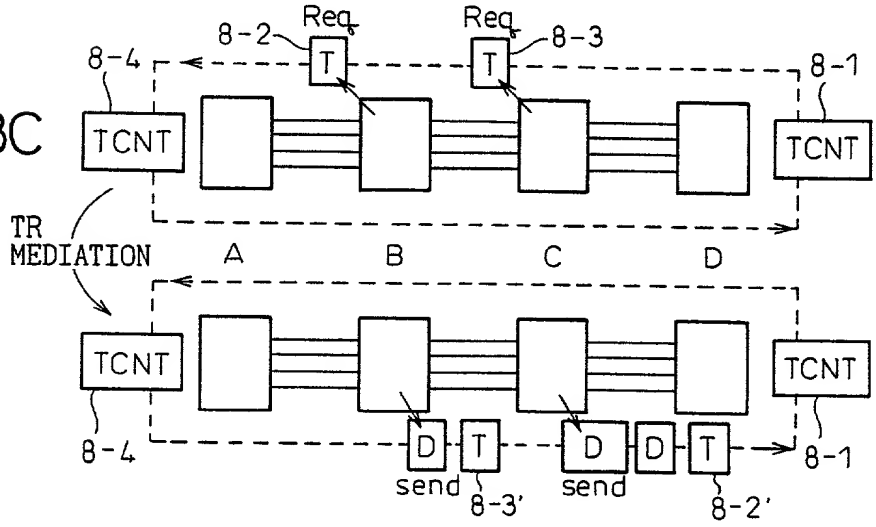


Fig.9

STRUCTURE OF TOKEN PACKET

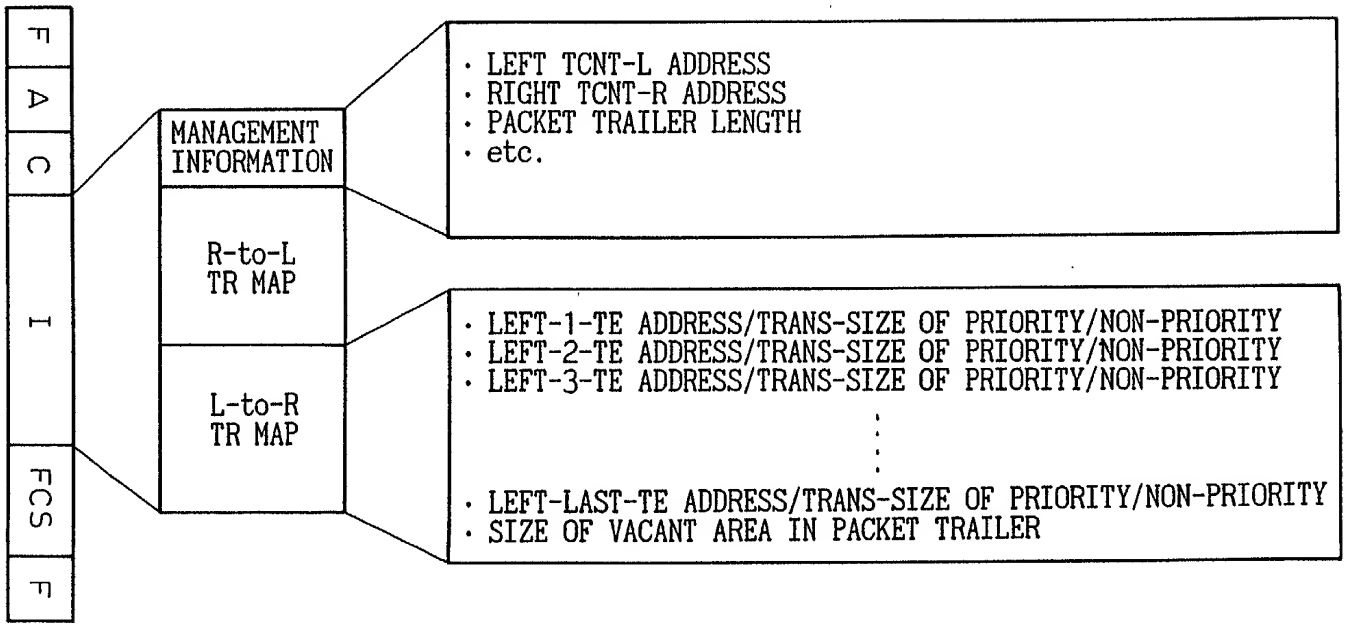


Fig.10

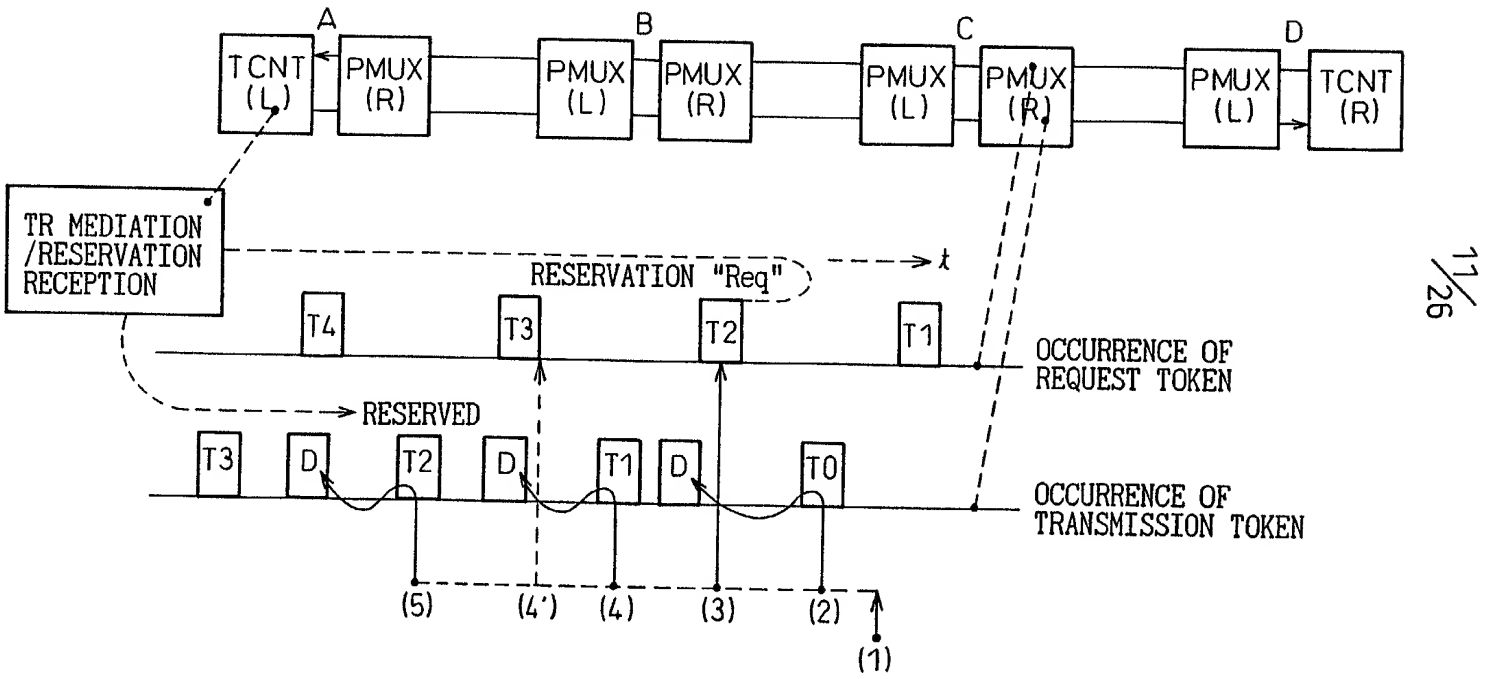

A
B
C
D
TCNT (L)
PMUX (R)
PMUX (L)
PMUX (R)
PMUX (L)
PMUX (R)
PMUX (L)
TCNT (R)
TR MEDIATION /RESERVATION RECEPTION
RESERVATION "Req"
t
T4
T3
T2
T1
OCCURRENCE OF REQUEST TOKEN
RESERVED
T3
D
T2
D
T1
D
T0
OCCURRENCE OF TRANSMISSION TOKEN
(5)
(4')
(4)
(3)
(2)
(1)

Fig.11

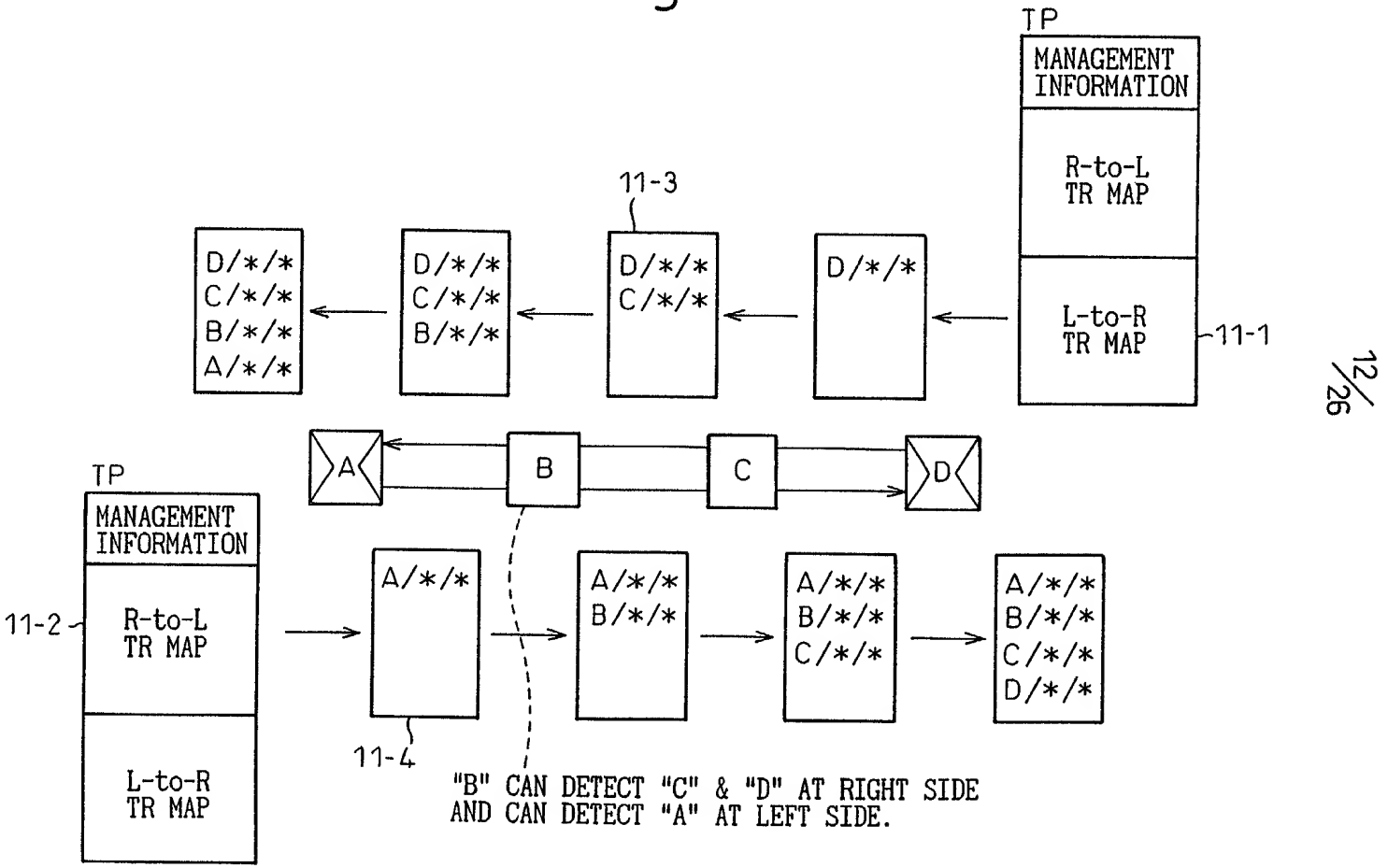

TP
MANAGEMENT INFORMATION
R-to-L TR MAP
L-to-R TR MAP
11-1
11-3
D/*/*
C/*/*
B/*/*
A/*/*
A
B
C
D
TP
MANAGEMENT INFORMATION
R-to-L TR MAP
L-to-R TR MAP
11-2
11-4
"B" CAN DETECT "C" & "D" AT RIGHT SIDE
AND CAN DETECT "A" AT LEFT SIDE.

Fig.12

In=#1 \ In=#0	DATA FRAME HAS NOT ARRIVED	"MASTER-INFORMING" OF MASTER NODE "m" HAS ARRIVED	"MASTER-INFORMING" AND "MASTER-INVITING" OF MASTER NODE "m" HAVE ARRIVED
DATA FRAME HAS NOT ARRIVED	NODE IS CHANGED TO "MASTER" AND TRANSMITS "MASTER-INFORMING" AND "MASTER-INVITING" TO LINES (#0,#1) (RAS-r1,RAS-r4)	NODE IS CHANGED TO "MASTER" AND TRANSMITS "MASTER-INFORMING" AND "MASTER-INVITING" TO LINE (#0) (RAS-r1,RAS-r4)	NODE IS CHANGED TO "MASTER" AND TRANSMITS "MASTER-INFORMING" AND "MASTER-INVITING" TO LINE (#0) (RAS-r1,RAS-r4)
"MASTER-INFORMING" OF MASTER NODE "n" HAS ARRIVED	NODE IS CHANGED TO "MASTER" AND TRANSMITS "MASTER-INFORMING" AND "MASTER-INVITING" TO LINE (#1) (RAS-r1,RAS-r4)	if m=n≦ address of its own node then,node is changed to master,and transmits "master-informing" (RAS-r3) if m=n> address of its own node then,node is changed to slave (RAS-r3) if m≠n then,node is changed to slave (RAS-r2)	NODE IS CHANGED TO "MASTER" AND TRANSMITS "MASTER-INFORMING" (RAS-r5,RAS-r7)
"MASTER-INFORMING" AND "MASTER-INVITING" OF MASTER NODE "n" HAVE ARRIVED	NODE IS CHANGED TO "MASTER" AND TRANSMITS "MASTER-INFORMING" AND "MASTER-INVITING" TO LINE (#1) (RAS-r1,RAS-r4)	NODE IS CHANGED TO "MASTER" AND TRANSMITS "MASTER-INFORMING" (RAS-r5,RAS-r7)	NODE IS CHANGED TO "SLAVE" (RAS-r6)

Fig.13A

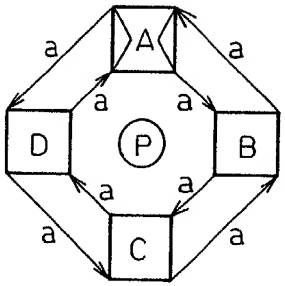
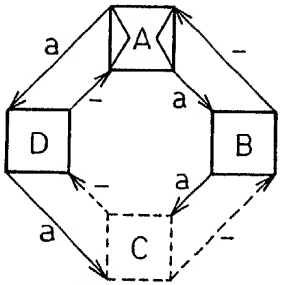


Fig.13B



NODE
DISCONNECTED

Fig.13C

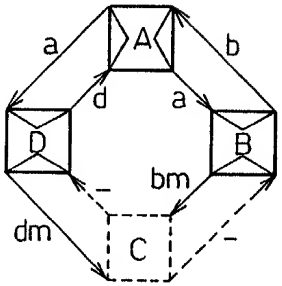


Fig.13D

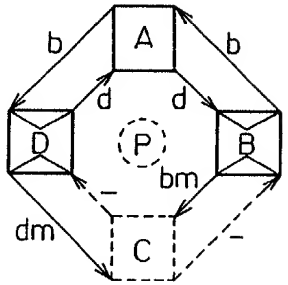
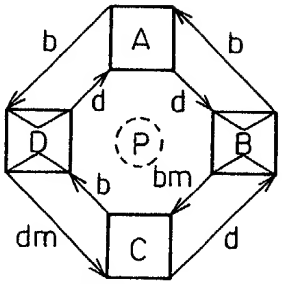


Fig.13E



NODE
RECOVERED

Fig.13F

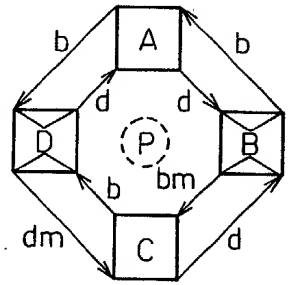


Fig.13G

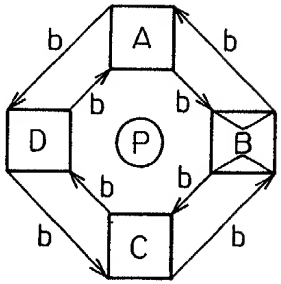


Fig.14A

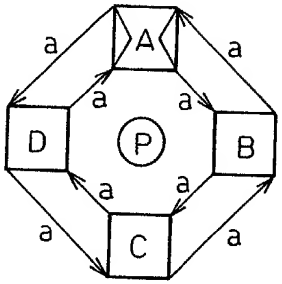


Fig.14B

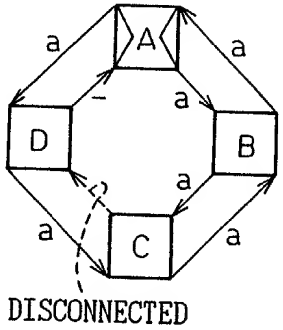


Fig.14C

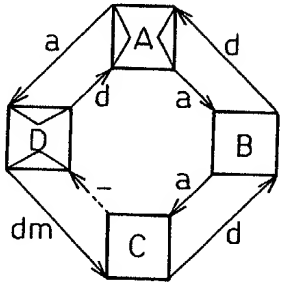


Fig.14D

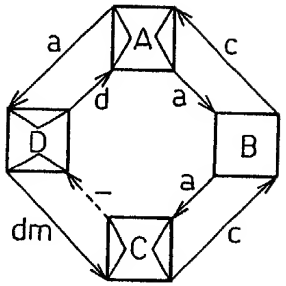


Fig.14E

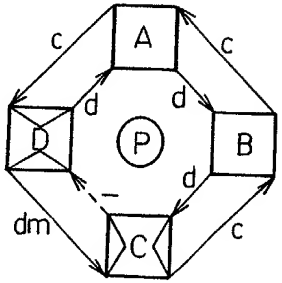


Fig.14F

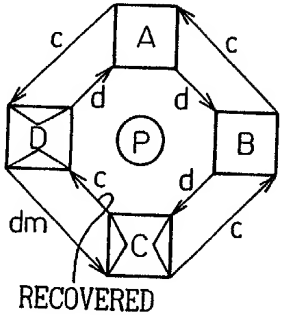


Fig.14G

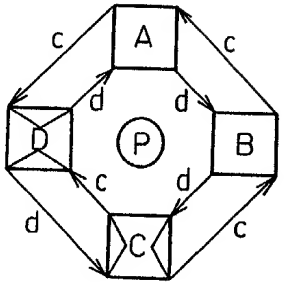


Fig.14H

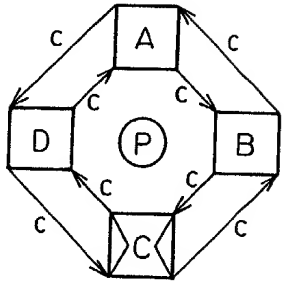


Fig.15A

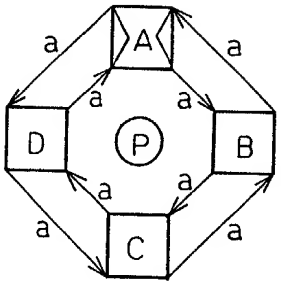


Fig.15B

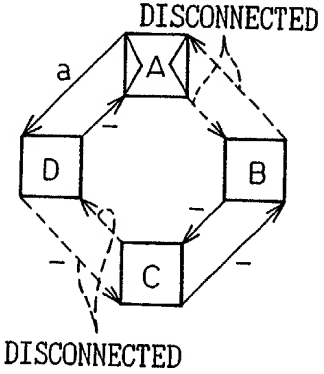


Fig.15C

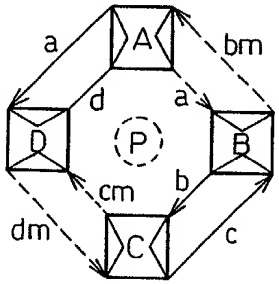


Fig.15D

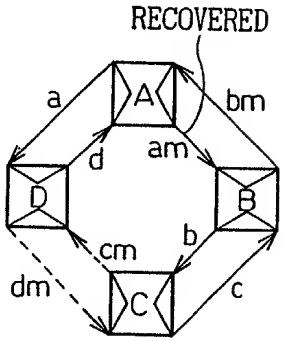


Fig.15E

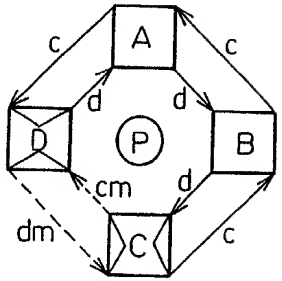


Fig.16A

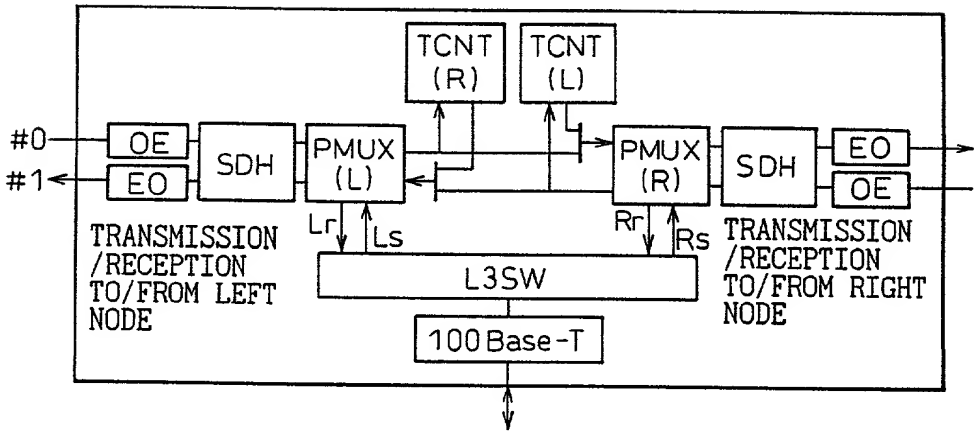


Fig.16B

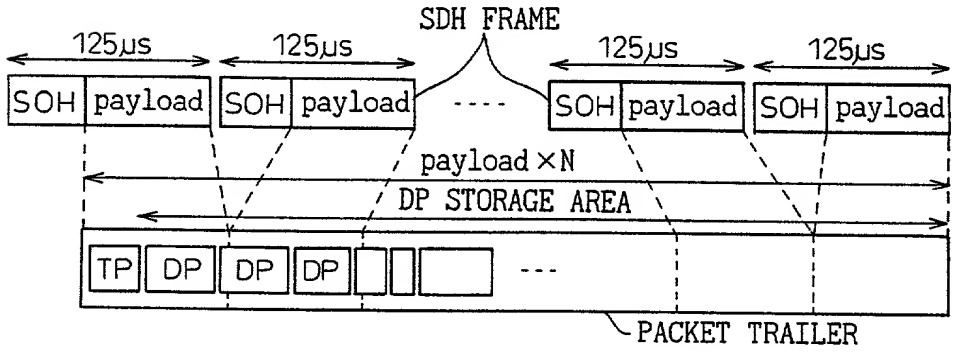


Fig.16C

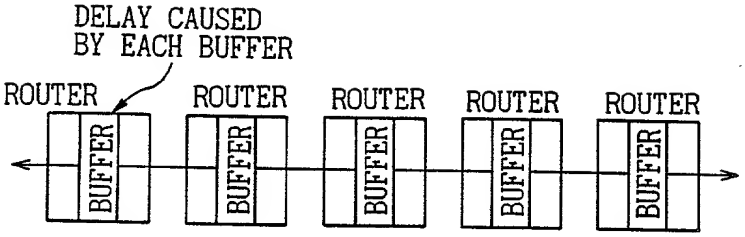


Fig.16D

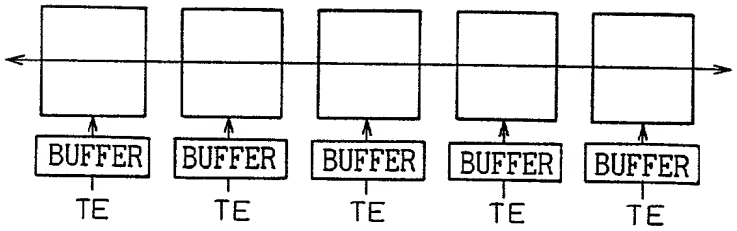


Fig.17A

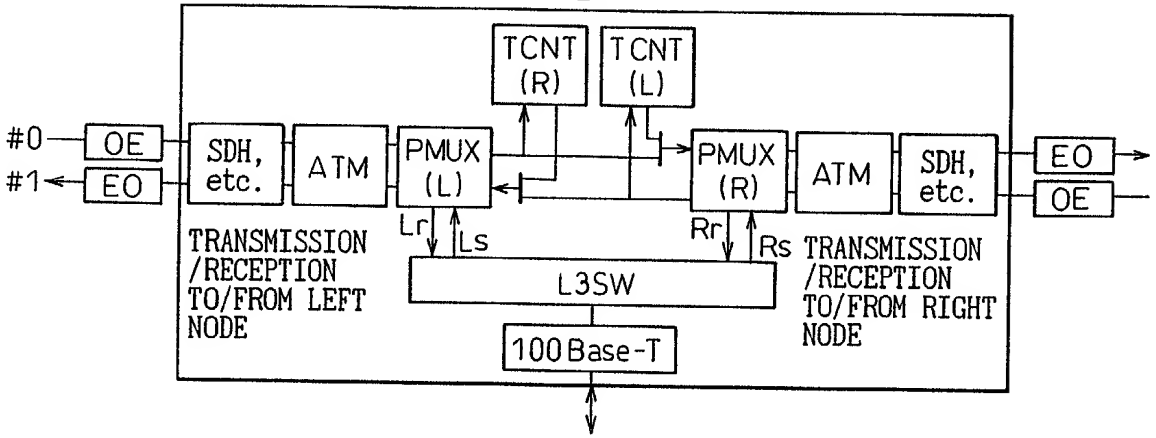


Fig.17B

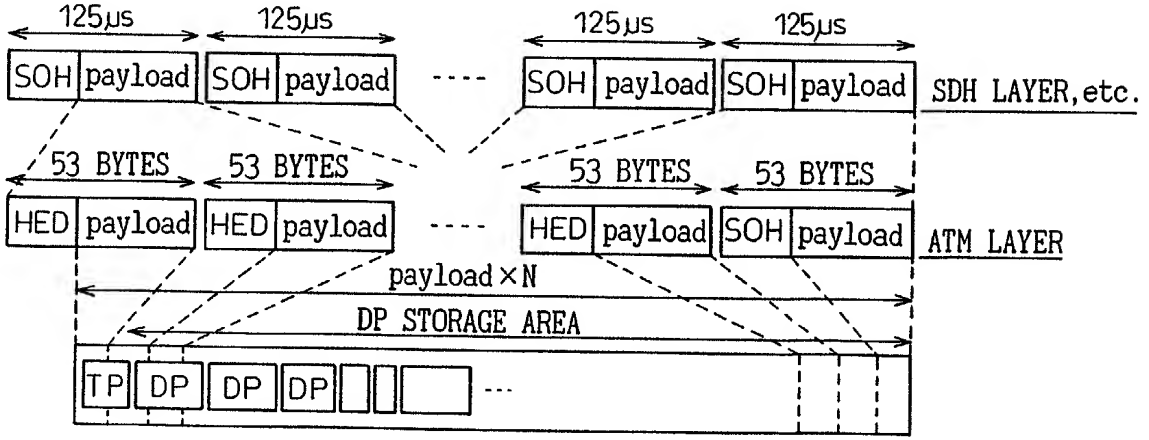


Fig.18A
PRIOR ART

THE SAME DATA IS DELIVERED ON LINES #0 AND #1, AND SELECTED AT RECEPTION SIDE

- COMMUNICATES ON ONE LINE
- THE OTHER LINE IS NOT USED

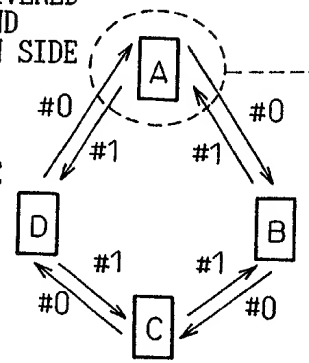


Fig.18B
PRIOR ART

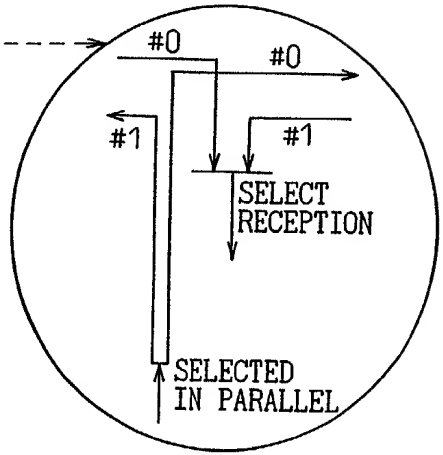


Fig.18C
PRIOR ART

IN THE CASE OF DATA BEING TRANSMITTED FROM NODE "C" TO "A"

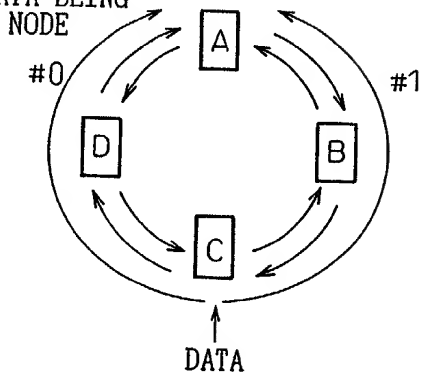


Fig.19A
PRIOR ART

LOOP-BACK CONNECTION
AT ABNORMAL STATE

USUALLY,
COMMUNICATED BY
ONLY LINE #0

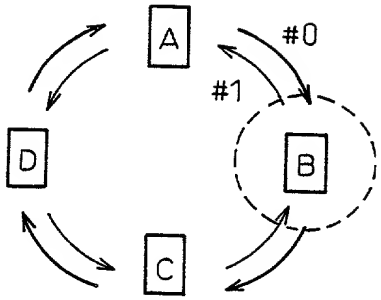


Fig.19B
PRIOR ART

IN THE CASE OF DATA BEING
TRANSMITTED FROM
"C" TO "A"

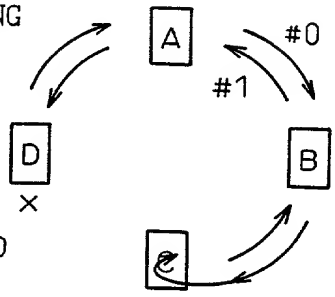


Fig.20A
PRIOR ART

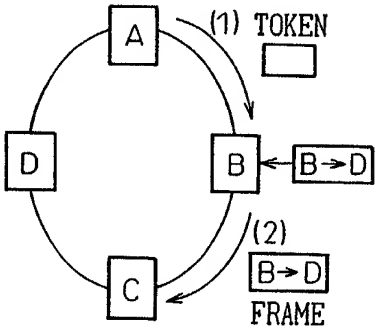


Fig.20B
PRIOR ART

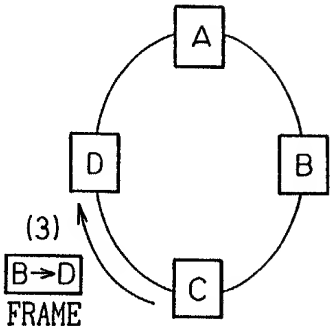


Fig.20C
PRIOR ART

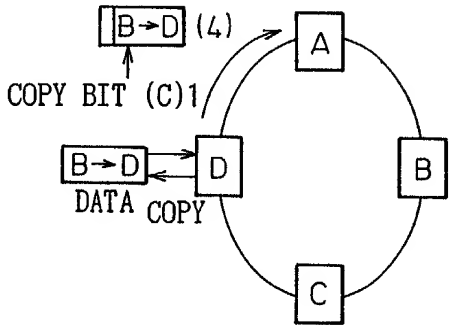


Fig.20D
PRIOR ART

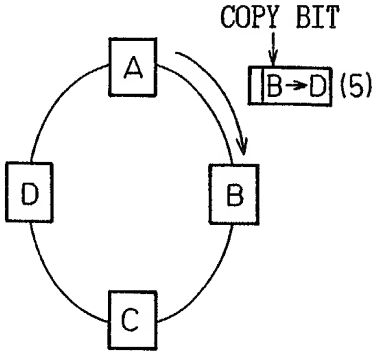


Fig.20E
PRIOR ART

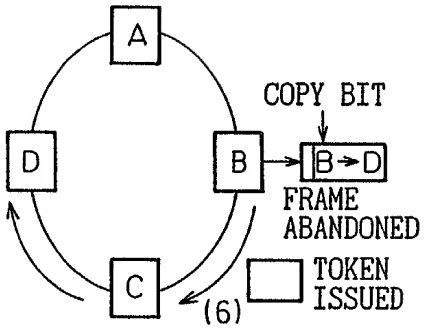


Fig.21A
PRIOR ART

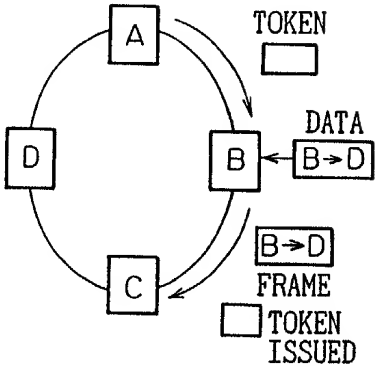


Fig.21B
PRIOR ART

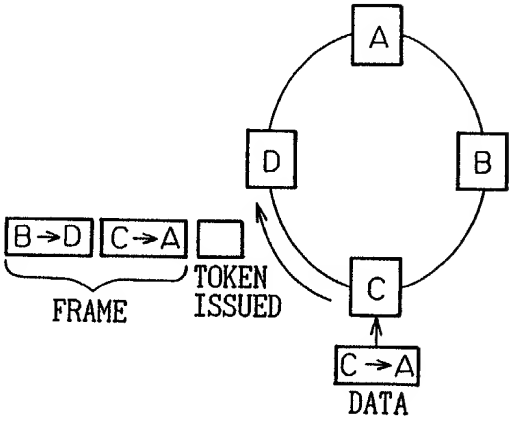


Fig.21C
PRIOR ART

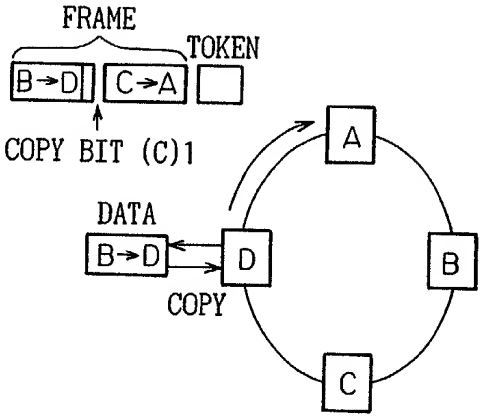


Fig.21D
PRIOR ART

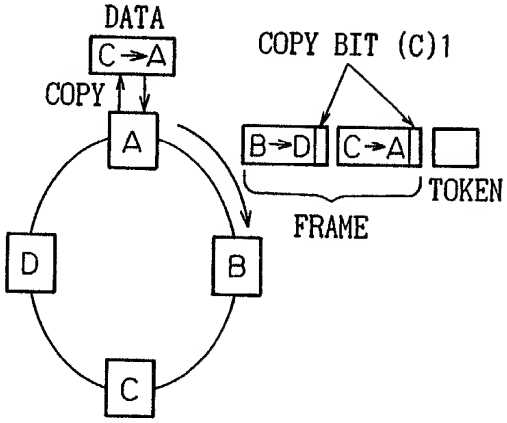
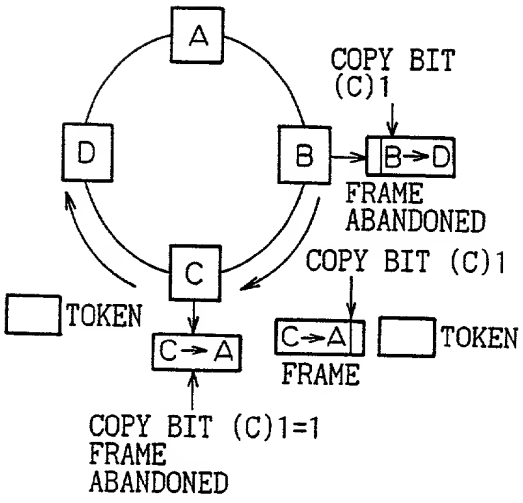



Fig.21E
PRIOR ART